

Overview

The HP StorageWorks 60 Modular Smart Array enclosure is a 2U Serial Attach SCSI (SAS) disk drive storage enclosure supporting 3.5 inch SAS, Serial ATA (SATA) and SAS Midline (MDL) drives. This enclosure delivers industry-leading data performance, availability, storage density, and upgradeability to meet customers' demanding and growing storage needs. This enclosure is designed to support 3.5 inch Universal SAS, SATA or SAS MDL hard drive form factors. The MSA60 enclosure supports direct attach storage (DAS) to HP ProLiant and HP Integrity Servers. The MSA60 supports the cascading of shelves in a 1+3 configuration to allow a maximum of 48 drives in an 8U configuration behind each of the two external ports on the HP Smart Array P800 or the HP Smart Array E500 for a total of 96 drives in 8 enclosures (this single controller port incorporates four lanes for a total max throughput of 12Gb/s for SAS). On HP ProLiant servers Dual Domain support is available for the HP Smart Array P800 attached to a MSA60 with the addition of the HP StorageWorks Dual Domain I/O Module Option (AG779A). (Single initiator environment only.)

The MSA60 also supports the HP Smart Array P600 controller. Behind the single external port on the HP Smart Array P600 controller 1+3 cascading allows a maximum of 48 drives in an 8U configuration.

For HP-UX and Open VMS environments on HP Integrity Servers the MSA60 supports the HP (AH303A) SC44Ge Host Bus Adapter with the addition of the HP StorageWorks Dual Domain I/O Module Option (AG779A). Behind the single external port on the HP (AH303A) SC44Ge Host Bus Adapter 1+3 cascading allows a maximum of 48 drives in an 8U configuration. The HP (AH303A) SC44Ge Host Bus Adapter will only support HP-UX and Open VMS environments and will be available on all rack mounted HP Integrity Servers with PCIe slots.

The addition of the I/O Module with the HP SC44Ge Host Bus Adapter adds support for Multi Initiator JBOD Clusters. It will support HP-UX and Open VMS on selected HP Integrity servers only. The MSA60 with the I/O Module and the HP SC44Ge Host Bus Adapter will not support ProLiant servers. Multi Initiator JBOD clusters are supported with dual port SAS drives only.

Support for HP Serviceguard software on HP-UX with HP-UX 11iv2/11iv3 only.

HP Serviceguard monitors the health of each node and rapidly responds to failures in a way that minimizes or eliminates application downtime.

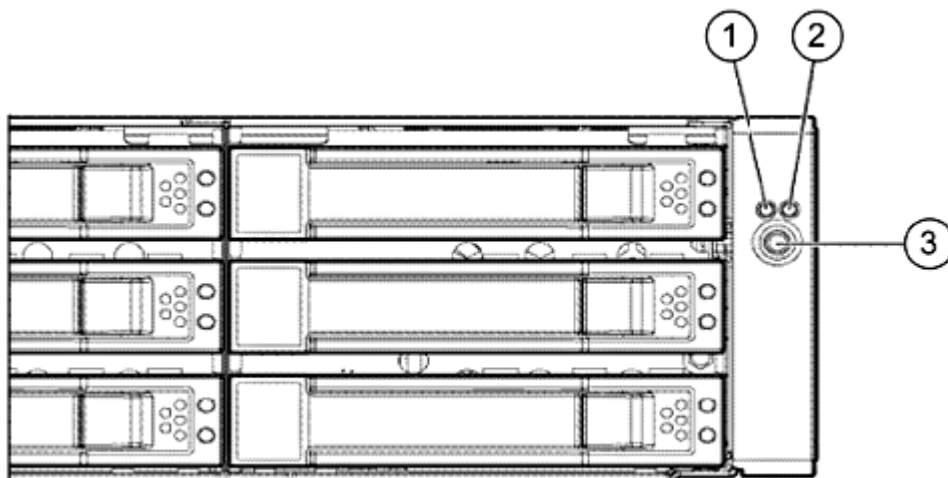
NOTE: HP Integrity servers that are supported:

rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 (only the version that support PCI-e cards)

What's New

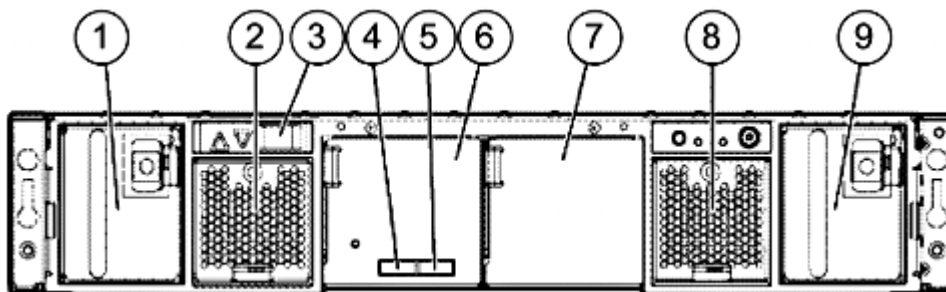
- Introducing two new MSA60 Dual Domain + Hard drive Bundles HP StorageWorks Dual Domain MSA60 5.4TB DP SAS Hard Drive Bundle (MSA60 w/12 450GB LFF DP SAS HDD + additional I/O Module)
 - HP StorageWorks Dual Domain MSA60 12TB SAS DP MDL Hard Drive Bundle (MSA60 w/12 1TB LFF DP SAS MDL HDD + Additional I/O Module)
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Overview



Front panel LEDs and buttons

1. Heartbeat LED
2. Fault LED
3. UID button/LED



Rear Panel components

- | | |
|--|-------------------|
| 1. Power Supply 1 | 6. I/O module bay |
| 2. System fan 1 | 7. I/O module bay |
| 3. Dual 7 segment display board (for future use) | 8. System fan 2 |
| 4. SAS in connector | 9. Power supply 2 |
| 5. SAS out connector | |

Overview

At A Glance

- 2U rackmount form factor
- 3 Gb/s SAS host connectivity
- Dual Domain support with HP Smart Array P800 Controller for HP ProLiant and Integrity servers (requires dual port SAS drives)
- Multi Initiator support with the SC44Ge Host Bus Adapter (AH303A) (HP-UX and Open VMS on selected HP Integrity Servers) with dual port SAS drives only
- Supports HP SAS single port and dual port 3G disk drives, (72 GB, 146 GB, 300 GB & 450 GB capacities)
- Ability to support HP SAS dual port MDL (Midline) 3G disk drives (750 GB & 1 TB capacities)
- Compatible with HP SATA 3G disk drives, (250 GB, 500 GB, 750 GB & 1TB capacities)
- Maximum storage capacity of 5.4 TB (with twelve HP SAS 3G 450 GB hard drives) or 12 TB (with twelve HP SATA 3G 1 TB hard drives or 1TB SAS MDL drives)
- 1+3 Cascade support (behind a single SAS port)
- Supports boot from storage
- Redundant hot-plug power supplies and fans standard
- Addition of second I/O Module adds Dual Domain capability providing higher level of redundancy and reliability

Standard Features

Modular Smart Array Family

The HP StorageWorks Modular Smart Array family delivers simple, affordable storage technology to meet today's demanding and growing IT needs. These storage solutions offer the best price/performance and best price/availability features for direct attach environments, small clusters, workgroups and entry-level SAN environments. Each solution is designed for easy deployment, secure operation, and reduced management costs while driving rapid return on investment.

MSA60

The HP StorageWorks MSA60 Enclosure (hereafter referred to as "MSA60") is a disk drive storage enclosure with 3G SAS host connectivity. These enclosures deliver industry-leading availability, storage density, and upgradeability to meet customers' demanding and growing storage needs. The MSA60 delivers the ideal mix of low-cost and high capacity, for minimum I/O workloads such as reference data, archival, and disk-to-disk backup.

Key Features

- 2U rackmount form factor
- SAS host interface
- Dual Domain support with HP Smart Array P800 Controller (requires dual port SAS drives)
- Multi Initiator support with the SCG44e Host Bus Adapter (AH303A) (HP-UX and Open VMS on selected HP Integrity Servers) with dual port SAS drives only
- Supports twelve 3.5-inch hot pluggable drives
- Ability to support 36 GB, 72 GB, 146 GB, 300 GB & 450 GB 3.5 inch 3G SAS single port and dual port drives
- Ability to support HP SAS dual port MDL (Midline) disk drives (750 GB and 1 TB capacities)
- Compatible with HP SATA 3G disk drives, (250 GB, 500 GB, 750 GB and 1 TB capacities)
- Modular design
- 1+3 Cascade support (behind a single SAS port)
- SATA 3G - Delivering data transfer rates greater than 100 MB/s
- Provides storage capacity of up to 5.4 TB per enclosure using 450GB DP SAS disk drives
- Provides storage capacity of up to 12 TB per enclosure using 1TB SATA disk drives or 1TB SAS MDL HDD
- Hot pluggable disk drives, power supplies, and fans
- Redundant fans and power supplies ship as standard equipment with base enclosure
- Each MSA60 enclosure comes with dual power supplies that are sufficient to provide power to the enclosure and maintain normal operating levels
- Integrated Environmental Monitoring - Monitors environmental conditions within the enclosure and components such as the power supply, fans and temperature
- Easy removal of parts provides better serviceability. No tools are required!
- Supports MS Windows 2003, MS Windows 2008, Red Hat Linux, SUSE Linux, Novell NetWare, HP-UX 11iv2 and 11iv3, Open VMS 8.3 1H
- Supported with Smart Array P800, the Smart Array E500 or the Smart Array P600 controller for HP ProLiant Servers and HP Integrity Servers in a single initiator environment.
- Attached to HP SC44Ge Host Bus Adapter for HP-UX and Open VMS support on selected HP Integrity Servers (servers that support PCI-e cards)
- Supported with ACU, ORCA and HP Systems Insight Manager through configuration utilities provided via the Smart Array controller
- RoHS compliant
- 3 year limited warranty (MSA60 enclosure only)
- Pre-Failure warranty that covers SAS and SATA disk drives (See note below)

NOTE: Customer must be running HP Systems Insight Manager in order to qualify for Pre-Failure warranty. The enclosure is only covered for the warranty period of the drive (3 years for SAS and 1 year

Standard Features

for SATA drives).

Product Highlights

High Levels of Storage Density, Data Protection, and Functionality

- **Storage Capacity** - The MSA60 enclosure supports up to twelve SAS drives for a maximum capacity of 5.4TB SAS drives or 12TB with SATA or SAS MDL drives
- **Data Protection** - MSA60 is designed for a high level of data protection. It includes redundant fans and power supplies (standard), and support for various RAID level including RAID6 with ADG (depending upon the Smart Array Controller used)
- **Dual Domain** - Dual domain SAS creates redundant pathways from servers to storage devices. The redundant paths created by these configurations reduce or eliminate single points of failure within the storage network. This provides increased levels of high availability with redundant paths from the controller to the drives.
- **Storage Manageability** - The MSA60 features familiar configuration and management tools such as Array Configuration Utility (ACU) and HP Systems Insight Manager (SIM). Online Management Features include: Online Capacity Expansion, Online RAID Level Migration, Online Stripe Size Migration, Online Spares (Global)
- **Choice of Computing Platform** - The MSA60 is designed and qualified for HP ProLiant and HP Integrity servers
- **Advanced Data Guarding (RAID 6 with ADG) Fault Tolerance** - It allocates two sets of parity data across drives and allows simultaneous write operations. This level of fault tolerance can withstand two simultaneous drive failures without downtime or data loss.

Low Total Cost of Ownership

The modular, scalable design of the MSA60 provides an extremely flexible platform. You can buy what you need today and purchase additional capacity as your data storage needs grow, instead of making a large up-front investment. Additional drives and enclosures can be easily added as your needs dictate.

- **Cascading** – The MSA60 has the unique capability of cascading up to 4 – four enclosures behind a single SAS port (depends on the Smart Array Controller).
- **Tiered Storage** - MSA60 supports mixing SAS and SATA drives in the same enclosure, allowing you to more effectively utilize mission critical storage where you need it most.
- **Universal SATA Hard Drive** - Since the MSA60 supports HP Universal SATA drives, your investment in disk drives is protected and cost is minimized as you add new drives.
- **Pre-Failure Warranty** – Drives installed in a MSA60 and monitored under HP Systems Insight Manager are supported by a Pre-Failure (replacement) Warranty (3 years for SAS and 1 year for SATA drives). Pre-Failure Warranty allows for the replacement of designated drives in MSA60 before they actually fail when using HP Systems Insight Manager on HP ProLiant or HP Integrity servers.

NOTE: Some operating systems may not support all of these features.

- **Integrated Configuration and Management Tools** – The MSA60 utilizes the standard, integrated set of Smart Array management and utility software for HP ProLiant Servers. These tools consistently lower the cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage. HP-UX and Open VMS uses HP Integrity ODE for storage enclosure support.

MSA60 Components

MSA60 Enclosure

The 2U array houses up to twelve 3.5 inch Universal hot pluggable SAS or SATA drives. Each MSA60 includes the following standard components:

- MSA60 base enclosure with redundant power supplies and fan modules
- Rack mounting hardware kit
- 0.5m mini-SAS cable
- Two AC power cords and two PDU interconnect cords

Smart Array P800 Features

- HP's highest performing 16-port PCI-express controller with expander support
- Expander support enables the addition of external storage, allowing increased number of drives for increased performance
- Provides highest level of data protection standard by using RAID 6 with Advanced Data Guarding
- Supports a maximum total of 104 hard drives (96 drives across eight enclosures plus 8 drives in the server internal backplane)
- Supported in a single initiator environment

Smart Array E500 Features

- HP's first external connect only PCI Express (PCIe) Serial Attached SCSI (SAS) RAID controller
- Expander support enables the addition of external storage, allowing increased number of drives for increased performance
- Offers RAID 0, 1 & 0+1 and can be upgraded with battery-backed write cache (BBWC) module for RAID 5
- Supports a maximum total of 108 hard drives
- Supported in a single initiator environment

HP (AH303A) SC44Ge Host Bus Adapter

- SAS technology delivers high performance and data bandwidth up to 3 Gbps per physical link.
- PCI Express x8 capable
- PCIe x8 (2.5 GB/s bandwidth)
- Supported in a Multi Initiator environment

RAID

Several fault tolerant configurations keep data available and servers running while drives are being replaced – RAID levels that offer fault tolerance include:

- RAID 6 with ADG: Allocates the equivalence of two parity drives across multiple drives and allows simultaneous write operations.
- Distributed Data Guarding (RAID 5): Allocates parity data across multiple drives and allows simultaneous write operations.
- Drive Mirroring (RAID 1 and 1+0 Striped Mirroring): Allocates half of the drive array to data and the other half to mirrored data, providing two copies of every file.

Dual Domain (NEW)

Dual domain SAS creates redundant pathways from servers to storage devices. The redundant paths created by these configurations reduce or eliminate single points of failure within the storage network. This provides increased levels of high availability with redundant paths from the controller to the drives. Dual domain SAS implementations make it possible to tolerate host bus adapter (HBA) failure, external cable failure, expander failure, failure in a spanned disk (JBOD) environments.

Software Components

Utilities	The MSA60 utilizes a single, consistent set of utility software for storage and RAID management, setup, configuration and troubleshooting. This consistency reduces the cost of ownership by reducing the training and technical expertise necessary to install and maintain your HP server storage solution.
Configuration Utilities	Array Configuration Utility (ACU) [On-line for Microsoft and Linux, Remote Web-Based & Off-line] Option ROM Configuration for Arrays (ORCA), NetWare ACU CPQONLIN (only online support no Web based support)
Management/Health Utilities	HP Systems Insight Manager

Array Configuration Utility (ACU)	<ul style="list-style-type: none">● Provides a graphical view of HP drive array configurations.● Easy to use Wizards for configuration.● Web Based ACU supports On-Line, Remote Web Based and Off-line configuration.● Supports on-line configuration for Microsoft, NetWare and Linux.
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HP Systems Insight Manager	<ul style="list-style-type: none">● Powerful storage, server and server option management tool.● Monitor storage from a remote central location.● Browser based Insight Manager 7 provides full access from anywhere on the Intranet, eliminating the need for a dedicated Insight Manager console.
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Supported Operating Systems	<ul style="list-style-type: none">● HPUX 11iv2/11iv3● Microsoft Win PE● Windows Server 2003: 2003 SP2 and later● Web Edition:<ul style="list-style-type: none">○ Embedded Systems Edition○ Standard Edition and Standard x64 Edition: Enterprise Edition and Enterprise x64 Edition: Datacenter Edition and Datacenter x64 Edition: (non-program Datacenter)○ Compute Cluster Server 2003 (CCS 2003)● Windows 2008:<ul style="list-style-type: none">○ Web Server○ Small Business○ Embedded Systems○ Standard Edition and Standard x64 Edition:○ Enterprise Edition and Enterprise x64 Edition: supported on all servers○ Datacenter Edition and Datacenter x64 Edition: (non-program Datacenter)● Windows HPC Server 2008● Microsoft Windows Server 2003/R2 (Std. & EE, both 32 & 64-bit)● Microsoft Windows Server 2003/R2 SBS● Microsoft Windows Server 2003/R2 Web Edition● Microsoft Windows Server 2003 Standard Edition● Microsoft Windows Server 2003 Enterprise Edition● Microsoft Windows Server 2003 on Itanium● Novell NetWare 6.5 Open Enterprise Server● Open VMS V8.3 1H● Red Hat Enterprise Linux 5 (x86, AMD/64/EM64T)● Red Hat Enterprise Linux 4 (x86, AMD/64/EM64T)● Red Hat Enterprise Linux 3 (x86,AMD64/EM64T)● Red Hat Enterprise Linux 4 for IA64
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Software Components

- Red Hat Enterprise Linux 5 for IA64
- SLES 9 (x86, AMD/64/EM64T)
- SLES 10 (x86, AMD/64/EM64T)
- Solaris 10 (x86)
- SUSE Linux Enterprise Server 10 for IA64
- VMware ESX 3.5.x

NOTE: HPUX 11iv2/11iv3 (for Dual Domain only)

Needs I/O Module (#AG779A), and HP SC44Ge Host Bus Adapter or HP Smart Array P800 Controller
Qualified for the following HP Integrity servers:

rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 (only the version that support PCI-e cards)

NOTE: Open VMS (for Dual Domain only)

Needs I/O Module (#AG779A), and HP (AH303A) SC44Ge Host Bus Adapter

Qualified for the following HP Integrity servers:

rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 (only the version that support PCI-e cards)

Service and Support, HP Care Pack, and Warranty Information

Service and Support

Three-year limited parts only warranty, including hardware diagnostic support, pre-failure warranty (coverage of hard drives, memory and processors). The warranty is fully supported by HP Services and a worldwide network of resellers and service providers. In addition 90-day's getting started software telephone support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services.

NOTE: The MSA60 has a limited 3 year parts only warranty. The SAS drives have a 3 year warranty. SATA drives have a 1 year warranty

Care Pack services provide a range of life cycle support options that let you choose the service levels that meet your business requirements, from basic to mission-critical.

A full range of HP Care Pack hardware and software services are available including:

- Installation and start up
- Education courses
- Extended onsite hardware coverage hours from same business day 13 hours, 5 day to 24 hours, 7 days call window with options including 4-hour response or 6-hour Call To Repair
- Comprehensive range of software technical support for Microsoft, Linux, ProLiant Essentials solutions helping to deliver high level of application availability. Response times range from 30 minutes for critical problems to 2 hours.
- System Management, Performance Services and Mission Critical Support Solution

Service includes HP branded hardware options qualified for the storage enclosure, purchased at the same time or afterwards, internal to the enclosure. These will be covered at the same service level and coverage period as the storage enclosure.

NOTE: For more information on HP Care Pack services, contact any of our worldwide sales offices or resellers or visit our worldwide Web site on the Internet at: <http://www.hp.com/hps/carepack>

NOTE: For more complete information on HP Services offerings, customers and resellers, please visit us at: <http://www.hp.com/hps>

NOTE: Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

HP Care Pack Information Flexible Support	1 Year Support	HA101A1-87G
		HA103A1-87G
		HA104A1-87G
		HA105A1-87G
		HA109A1-87G
		HA110A1-87G
	3 Year Support	HA111A1-87G
		HA112A1-87G
		HA101A3-87G
		HA103A3-87G
		HA104A3-87G
		HA105A3-87G
HA109A3-87G		

Service and Support, HP Care Pack, and Warranty Information

		HA110A3-87G
		HA111A3-87G
		HA112A3-87G
	4 Year Support	HA101A4-87G
		HA103A4-87G
		HA104A4-87G
		HA105A4-87G
		HA109A4-87G
		HA110A4-87G
		HA111A4-87G
		HA112A4-87G
	5 Year Support	HA101A5-87G
		HA103A5-87G
		HA104A5-87G
		HA105A5-87G
		HA109A5-87G
		HA110A5-87G
		HA111A5-87G
		HA112A5-87G
	Installation & Start-Up	HA113A1-564
Fixed Care Packs	HP 1Y NBD,9X5 MSA60 HW Support	UF297E
	HP 1Y 4h 13x5 MSA60 HW Support	UF298E
	HP 1Y 4h 24x7 MSA60 HW Support	UF299E
	HP 1y 6h CTR MSA60 HW Support	UF300E
	HP 3y NBD 9x5 MSA60 HW Support	UF301E
	HP 3y 4h 13x5 MSA60 HW Support	UF302E
	HP 3y 4h 24x7 MSA60 HW Support	UF303E
	HP 3y 6h CTR MSA60 HW Support	UF304E
	HP 1y PW NBD MSA60 HW Support	UF305PE
	HP 1y PW 4h 13x5 MSA60 HW Support	UF306PE
	HP 1y PW 4h 24x7 MSA60 HW Support	UF307PE
	HP 1y PW 6h CTR MSA60 HW Support	UF308PE
	Hardware Installation, Electronic	U8132E

Configuration Information

Step 1: Base Configuration

Model	Shipping Dimensions	Part Number
MSA60	HP StorageWorks 60 Modular Smart Array	418408-B21
I/O Module	HP StorageWorks Modular Dual Domain I/O Module Option Kit	AG779A
<p>NOTE: The I/O Module is a field upgradeable Option Kit the addition of which in the MSA60 will allow dual domain capability providing higher level of redundancy and reliability.</p> <ul style="list-style-type: none"> • HP Smart Array P800 Controller (381513-B21) supports Dual Domain on the MSA60 with the addition of the HP StorageWorks Dual Domain I/O Module in a single initiator environment. <ul style="list-style-type: none"> ○ Requires Dual port SAS drives • HP (AH303A) SC44Ge Host Bus Adapter supports Dual Domain on the MSA60 with the addition of the HP StorageWorks Dual Domain I/O Module in a Multi Initiator environment. Supports only HP-UX and Open VMS and on selected HP Integrity Servers only. 		
MSA60 SAS Single Port drive bundles	HP StorageWorks MSA60 1.8TB SAS SP HDD Bundle (MSA60 w/12 146 GB 15K SAS LFF SP HDD)	AG822A
MSA60 SAS Dual Port drive bundle	HP StorageWorks MSA60 3.6TB SAS SP HDD Bundle (MSA60 w/12 300 GB 15K SAS LFF SP HDD)	AG824A
<p>NOTE: Drives in the bundles are Single Port drives only.</p>		
MSA60 SAS MDL Dual Port drive bundle	HP StorageWorks MSA60 5.4TB SAS DP HDD Bundle (MSA60 w/12 450GB 15K SAS LFF DP HDD + Additional I/O Module)	AP713A
	HP StorageWorks MSA60 12 TB SAS DP MDL HDD Bundle (MSA60 w/12 450GB 15K SAS LFF DP HDD + Additional I/O Module)	AP714A
MSA60 SATA drive bundle	HP StorageWorks MSA60 9TB SATA HDD Bundle (MSA60 w/12 750 GB SATA 7.2K LFF SP HDD)	AG823A
<p>NOTE: The MSA60 bundles will be available in the Americas, Asia Pacific (AP) and Japan only. They will not be available in Europe, Middle East and Africa.</p>		

Step 2: Array Controllers

	Description	Part Number
Smart Array Controllers Supported (Single Domain)	HP ProLiant Servers	
	HP Smart Array P800 controller	381513-B21
	HP Smart Array E500 controller	435129-B21
	HP Smart Array P600/256 BBWC Controller	337972-B21
	HP Integrity Servers	
	HP Smart Array P800 controller	AD335A
	HP Smart Array E500 controller	AH226A
	HP Smart Array P600/256 BBWC Controller	337972-B21

Configuration Information

NOTE: The HP Smart Array P800 supports the cascading of shelves in a 1+3 configuration to allow a maximum of 48 drives in an 8U configuration behind or the HP Smart Array P800 controller for a total of 96 drives on the two external ports.

NOTE: Dual Domain is support for the HP Smart Array P800 controller (single initiator only)

NOTE: The HP Smart Array P600 supports the cascading of shelves in a 1+3 configuration to allow a maximum of 48 drives in an 8U configuration behind or the HP Smart Array P600 controller as the P600 has only a single external port.

NOTE: The Smart Array E500 offers RAID 0, 1 and 0+1 and can be upgraded with ProLiant server to RAID 5 with battery-backed write cache (BBWC) module - 383280-B21.

Smart Array Controllers Supported
(Dual Domain)

HP ProLiant Servers

HP Smart Array P800 controller

381513-B21

HP Integrity Servers

HP SC44Ge Host Bus Adapter

AH303A

NOTE: Only HP-UX and Open VMS on selected HP Integrity servers supported.

HP Integrity servers that are supported:

rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 (only the version that support PCI-e cards).

Step 3: Choose HP ProLiant Server(s)/HP Integrity Server(s)

Server Compatibility

- HP ProLiant ML310 G3
- HP ProLiant ML310 G4
- HP ProLiant ML350 G5
- HP ProLiant ML370 G5
- HP ProLiant ML570 G4
- HP ProLiant DL320 G4
- HP ProLiant DL320 G5
- HP ProLiant DL320s
- HP ProLiant DL360 G5
- HP ProLiant DL365
- HP ProLiant DL380 G5
- HP ProLiant DL385 G5
- HP ProLiant DL580 G4
- HP ProLiant DL585 G2

HP Integrity Server rx2660 with combination PCIx/PCIe riser only

HP Integrity Server rx3600 with combination PCIx/PCIe backplane only

HP Integrity Server rx6600 with combination PCIx/PCIe backplane only

HP integrity Server rx7640 with combination PCIx/PCIe only

HP integrity Server rx8640 with combination PCIx/PCIe only

HP integrity Server sx2000 with combination PCIx/PCIe only

NOTE: HP ProLiant servers above may not support all Smart Array controllers, see matrix on:

<ftp://ftp.compaq.com/pub/products/servers/ProLiantstorage/arraycontrollers/compatibility-matrix.pdf>

NOTE: HP Integrity Server home:

http://www.hp.com/products1/serverconnectivity/support_matrices.html

Configuration Information

Step 4: Choose Hard Drives

SAS Drives	HP 72GB 3G 15K 3.5 inch SAS SP HDD	375870-B21
	HP 146GB 3G 15K 3.5 inch SAS SP HDD	375872-B21
	HP 300GB 3G 15K 3.5 inch SAS SP HDD	431944-B21
	HP 72GB 3G 15K S3.5 inch SAS DP HDD	384852-B21
	HP 146GB 3G 15K 3.5 inch SAS DP HDD	384854-B21
	HP 300GB 3G 15K 3.5 inch SAS DP HDD	416127-B21
	HP 450GB 3G 15K 3.5 inch SAS DP HDD	454232-B21

NOTE: In a single domain environment Dual Port (DP) SAS drives will function as Single Port (SP) drives only.

NOTE: Only Dual Port (DP) SAS drives will work in the Dual Domain environment. Dual Domain environment requires the HP StorageWorks I/O Module Option (# AG779A).

SAS MDL (Midline)	HP 750 GB 3G 7.2K 3.5 inch SAS DP MDL HDD	461135-B21
	HP 1 TB 3G 7.2K 3.5 inch SAS DP MDL HDD	461137-B21

SATA Drives	HP 1TB 3G 7.2K 3.5 inch SATA MDL HDD	454146-B21
	HP 750 GB 3G 7.2K 3.5 inch SATA MDL HDD	458930-B21
	HP 500 GB 3G 7.2K 3.5 inch SATA MDL HDD	458928-B21
	HP 250 GB 3G 7.2K 3.5 inch SATA MDL HDD	458926-B21

NOTE: The following PN#s for SATA drives have been replaced by new PN#s:

250GB: New PN# 458926-B21 replaces Old PN# 349239-B21

500GB: New PN# 458928-B21 replaces Old PN# 394573-B21

750GB: New PN# 458930-B21 replaces Old PN# 432341-B21

NOTE: SATA drives are not Dual Port drives

NOTE: There is a known compatibility issue with some early 3.5 inch SATA HDD that will make them unable to be used with the MSA20/60. Customers should verify that they are not using hard drive part number 356536-002/003 (spare 353044-001). The following SATA hard drives require SATA FirmWare flash in order to work properly. They are:

500GB SATA 1.5 - Model # 6H500F0, min F/W rev: HA431DD0

80GB RoHS Mask Rom SATA 1.5, Model # 6L080M0, min F/W rev BACE1GG0

160GB RoHS Mask Rom SATA 1.5, Model # 6L160M0, min F/W rev BACE1GG0

250GB RoHS Mask Rom SATA 1.5, Model # 6L250S0, min F/W rev BACE1GG0

NOTE: Go to the HP Hard Drive Compatibility table for complete drive compatibility information (<http://www.hp.com/products/harddiskdrives>). Using hard drives in unsupported configurations will result in voiding the warranty and could result in damage to the drive and/or loss of data.

Configuration Information

Step 5: Choose Rack Option

HP Racks	HP Universal Rack 10642 G2 Pallet ALL	AF001A
	HP Universal Rack 10642 G2 Shock Rack	AF002A
	HP Universal Rack 10642 G2 Crated ALL	AF003A
	HP Universal Rack 10642 G2 w/Ext Shock Rack	AF004A
	HP Universal Rack 10636 G2 Pallet ALL	AF011A
	HP Universal Rack 10636 G2 Shock Rack	AF012A
	HP Universal Rack 10636 G2 Crated ALL	AF013A
	HP Universal Rack 10636 G2 w/Ext Shock Rack	AF014A
	HP 10642 G2 200mm Extn Shock Rack	AF034A
	HP 10647 G2 200mm Extn Shock Rack	AF044A
	HP Module Cooling System	AF092A
	HP Rack S10614 (14U) Rack Cabinet – Shock Pallet	292302-B22

Step 6: Choose Cables

Cable Options	Cables used for connecting the HP Smart Array P800/512 BBWC Controller (P/N 381513-B21 or AD335A) or the HP Smart Array E500 (P/N 435129-B21 or AH226A) to MSA60	
	Mini SAS 4x 2M Cable All	407339-B21*
	Mini SAS 4x 4M Cable All	432238-B21*
	Mini SAS 4x 6M Cable All	432239-B21*
	* #OD1 will appear after this part number on your sales order if factory integration is indicated.	
	Cables used for connecting the HP Smart Array P600/512 BBWC Controller (P/N 337972-B21) or the HP SC44Ge Host Bus Adapter (P/N AH303A) to MSA60	
	SAS 4x to Mini SAS 4x 2M	419571-B21*
	SAS 4x to Mini SAS 4x 4M	419572-B21*
	SAS 4x to Mini SAS 4x 6M	419573-B21*
	*#OD1 will appear after this part number on your sales order if factory integration is indicated.	

Technical Specifications

LED Indicators for Drive Modules (2)	Online (bottom) Drive Failure/ID (top)
LED Indicators on Front Panel	Heartbeat LED Fault LED UID button/LED
LED Indicators on Rear Panel (6)	I/O Module LED UID button/LED Heartbeat LED Fault LED Power On/Standby button/system power LED Power supply LED
Host Interface	SAS 3 Gb/s
Maximum Number of Drives	Up to twelve, 3.5 inch SAS, SATA or SAS MDL drives
Temperature Range	Operating 50° to 95° F (10° to 35° C) Shipping -40° to 150° F (-40° to 66° C) NOTE: Rated 1°C per 1000 feet of elevation to 10,000 ft.
Relative Humidity	Operating 10% to 90% Non-operating Up to 95%
Input Power Requirements	Rated Input Voltage 100 to 240 VAC Rated Input Frequency 50 to 60 Hz Rated Input Current 3.9A at 110 VAC typical, 6A Maximum Input Power (max) 345 W
Heat Dissipation (maximum)	1175 Btu/hr* * Input Power and Heat Dissipation specifications are maximum values and apply to worst-case conditions at full rated power supply load. The power/heat dissipation for your installation will vary depending on the equipment configuration.
User Interface	Controller display with Status indicators (2) and push buttons (4) on front of controller
Logical Drives (LUN)	Up to 32 Logical drives when connected to P800 Smart Array controller
Maximum Logical Drive Size	> 2 TB
RAID Support	RAID 6 with ADG (Advanced Data Guarding) RAID 5 (Distributed Data Guarding) RAID 1 + 0 (Mirroring and Striping) RAID 1 (Mirroring) RAID 0 (Striping)
Upgradeable Firmware	4MB Flashable
Disk Drives and Enclosure Protocol Support	HP 3.5 inch SAS 3 Gb/s
I/O Module	Connector Type IPass (mini-SAS) Number of Ports Two (one IN, other is OUT)

Technical Specifications

MSA60 Enclosure	2U Rack Form Factor	
	Dimensions (HxWxD)	3.47 x 17.64 x 23.25 in (8.8 x 44.8 x 59 cm)
	Weight (base unit)	34 lb (15.4 kg)
	Weight (with all drives)	54 lb (24.6 kg)

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.